



MORPHOLOGY, ANATOMY AND HISTOCHEMICAL STUDIES ON COSTUS IGENUS NAK. (INSULIN PLANT)

Dr. Mrs. Sabiha V Syed (Bagwan)

Department of Botany, Shri. Shivaji College, Parbhani (M.S)

ABSTRACT

Costus igneus Nak. plant belongs to family *Costaceae* is commonly known as Insulin Plant. This plant was introduced in India few years back from South Central America as an ornamental plant in Kerala but because of its medicinal properties now a days it becomes popular anti diabetic drug plant in India used to manage diabetes. The leaves may be eaten raw or may be taken in powdered form as medicine dose. The medicinal property in the leaf is due to presence of phytochemicals like Alkaloids, Steroids, Flavonoids, Tanins and Saponins. Current paper deals with Morphology, Anatomy and Histochemical studies of leaves of *C.igneus* Nak plant which will help in identification of original fresh plant and powdered leaf material and check the adulteration and to guide future research.

KEYWORDS: *C.igneus*, Leaves, Insulin, Phytochemicals.

INTRODUCTION

Costus igneus Nak belongs to family *Costaceae* of monocots separated from Zinziberaceae on the basis of morphological and anatomical characters of vegetative organs includes presence of tetracyclic stomatas with asymmetric guard cells, uniseriate multicellular trichomes, parenchymatous tissue with irregular or isodiametric type is observed (Tomlinson 1956). There are 4 genera and 200 species of *Costaceae* are reported. Out of 200 species *Costus* is the largest genus with 150 species recorded from tropical regions of the world (Airy Shaw H.K, and Willis J. C 1973 & Humphries et.al 1985). Leaves of this plant are used to manage diabetes therefore most of the ayurvedic practitioners used it in ayurvedic medicine preparation as antidiabetic drugs. Fresh green leaves can be eaten raw as well as in chutnies by most of the diabetic peoples with belief that it lowers blood sugar level in many diabetic patients who tested blood sugar level after consumption (Melti R. 2018).

According to WHO 90% population of developing countries rely on herbal drugs for primary healthcare (WHO Policy on prespective medicine, 2002), and listed 21000 plants used in herbal medicine throughout the world, from India 2500 plant species are used as herbal drug plants of that 800 plants are having antidiabetic properties and used to anage diabetes on large scale by ayurvedic practioners and vaidyas (R.Patil et.al 2011). But due to trade secret of these ayurvedic practioners and poor knowledge in identification of original herbal drug plants one may use its adultrant or substitute drug plant therefore current paper focuses on the study of morphological, anatomical and histocheicals characteristic features of *Costus igneus* Nak plant which is consumed as antidiabetic plant to anage diabetes from India.

MATERIAL AND METHODS

The fresh plant material is collected from botanical garden of Shri. Shivaji College Parbhani for the study. The Plant is identified and confirmed by using flora of Maharashtra State (Almeda M. R 2011), Flora of Presidency of Bombay vol. II (Cook T. 1908).

The fresh hand sections of the leaves were used for the study of anatomical and histochemical characters studies and the shade dried powder of leaf is used to study organoleptic properties and ash analysis by following standard procedures (Jonasen D.A 1940)

RESULT AND DISCUSSION

Macroscopic characters:

C.ignus Nak plant is a perrinial evergreen rhizomatous herb with height 3-4 feet in height. The leaves green, simple, alternate spirally arranged forming attractive arching clumps originating from rhizomes. The leaves are acute, elliptical / oblong, 3-9 inches in length and 3-6 inches in diameter traversed by many parallel veins. At the terminal end of each branch yellow-orange flowers are produced on head like cones during hot days. (Plate 1)

Microscopic characters:

- The T.S. of leaf shows presence of Epidermis, mesophyll tissue and prominent vascular bundles in midrib region. The Epidermis is two to three layered on upper surface interrupted by uniseriate trichomes while single layered on lower surface made up of thin walled small isodiametric compactly arranged cells. Inner to epidermis on both surface 4-5 layered spongy parenchyma cells are present. The vascular bundles in mid rib region are collateral with wide masses of

xylem and small clusters of phloem surrounded by a thick band of sclerenchymatus patches. (Plate 2)

- Stomatas are tetracyclic with stomatal index 10. On upper epidermis multicellular uniseriate, trichomes are reported. (Plate 3)
- Histochemical Tests for confirmation of phytochemicals in fresh leaf sections tests were conducted by following standard procedures and the result shows presence of Alkaloid, Saponins, Flavonoids, Steroids, Terpenoids and Tanins in *C.ignues* Nak leaf samples (Table 1)
- Organoleptic studies on powdered leaf material was conducted as per standard protocol and the result obtain is the leaf powder is brown in color with smooth, powdery texture, it does not have any specific odour and has sour test.
- The physicochemical values were analysed by following standard procedures and the result is tabulated in Table 2. These values will help in checking the adultration as these are fixed values. Total ash value of 10 gm of leaf powder is 15.5% w/w, the acid insoluble ash is 0.1%w/w, water soluble ash is 0.18%, weight loss on drying 10 gm of fresh leaves reported is 50 % (Table 2)

CONCLUSION

C.igneus Nak leaf samples were studied for macroscopic, microscopic, histochemical, organoleptic properties and from the results it is conclude that this plant proved to posses secondary metabolites which provides medicinal property to this plant to manage diabetes.

Test	Reagent	Colour	Result
Steroids	Conc.Sulphuric Acid	Redish Brown	+ve
Tanins	Aq.Ferric chloride solution	Blakish brown	+ve
Starch	Iodine solution	Blue's brown	+ve
Alkaloids	Wagnors reagent	Yellowish Brown	+ve
Flavonoids	Amonia solution	Dark yellowish brown	+ve

Table 1: Histochemical test

Total Ash	15.5% w/w
Acid insoluble ash	0.1%w/w
Water soluble ash	0.18%
Moisture content loss after 5hrs	20 %

Table 2: Physicochemical analysis

REFERENCES

1. Tomlison P.B. (1956) - J. Linn. Soc. Bot. 55 (1956) – p.547-592.
2. Airy Shaw H.K and Willis J. C (1973) - A Dictionary of the flowering plants and Ferns , 8th edition Cambridge University Press, Cambridge (1973).
3. Humphries C.J , Zingiberaceae, Ginger, Cardamon and Tureric. In V.H Heywood (ed), Flowering Plants of the World, Equinox, Oxford (1985) p.p. 296.
4. Melti R.(2018) – Standardization, value addition and sensory evaluation of products prepared from insulin plant leaves (Costus igenous) . Int.Journal of Advance Research Vol. 3, 2018 ; 3:374 – 376.
5. World Health Organization, “Traditional medicine – growing needs and potential,” WHO Policy Perspective Medicines, vol2 pp 1-6,2002.
6. R.Patil ,R.Patil, B. Ahirwar and D.Ahirwar, “ Current Status of Indian Medicinal Plants with Antidiabetic Potential: A review”, Asian Pacific Journal of Tropical Biomedicine Vol.I,no. 2 pp. S291-298,2011
7. Almeida M.R (2011) – Flora of Maharashtra, KI India R&T centre, Thane, Orient Press, Mumbai 2011.
8. Cook T.(1908). – Flora of Presidency of Bombay, Vol.2. reprint publishers Botanical Survey of India 1958.
9. Jonasen D.A(1940) –Plant Microtechnique Mc Graw Hill Book CO; New York, 1940.

Plate 1 *C.ignus* Nak plantPlate 2 *C.ignus* Nak Leaf T.S

Plate 3a Stomata



Plate 3b Trichome